CLAIMS

What is claimed is:

1. A process for preparing a poly(trimethylene terephthalate) bicomponent fiber comprising:

(a) providing two poly(trimethylene terephthalate) melts,

(b) altering the intrinsic viscosity of at least one of said polymers such that after alteration, said polymers have intrinsic viscosities that differ by at least about 0.03 dL/g;

(c) providing the two poly(trimethylene terephthalate) melts to a spinnerette, and

(d) spinning bicomponent fiber from the poly(trimethylene terephthalate) melts.

2. The process of claim 1, wherein the two poly(trimethylene terephthalate) polymer melts are prepared by

(a) providing two different remelt systems; and

(b) remelting a poly(trimethylene terephthalate) in each of the remelt systems, wherein at least one of the remelt systems is operated so as to provide the poly(trimethylene terephthalate) melts having intrinsic viscosities that differ by at least about 0.03 dL/g.

3. The process of claim 1, wherein at least one of the following is used to alter the intrinsic viscosity of a poly(trimethylene terephthalate):

(a) poly(trimethylene terephthalate) water content;

(b) melt temperature; and

(c) melt residence time.

4. The process of claim 2, wherein at least one of the following is used to alter the intrinsic viscosity of a poly(trimethylene terephthalate) in one of the remelt systems:

(a) poly(trimethylene terephthalate) water content;
(b) remelt temperature; and
(c) remelt residence time.

5. The process of claim 1, wherein in (b) the intrinsic viscosity of at least one polymer is decreased.

6. The process of claim 1, wherein in (b) the intrinsic viscosity of at least one polymer is increased.

7. The process of claim 1 wherein the intrinsic viscosities of the poly(trimethylene terephthalate) melts differ by at least about 0.03 to about 0.5 dL/g.

8. The process of claim 7, wherein the intrinsic viscosities of the poly(trimethylene terephthalate) melts differ by at least about 0.03 to about 0.3 dL/g.

9. The process of claim 2 wherein the intrinsic viscosity of the poly(trimethylene terephthalate) in one of the remelt systems is lowered by at least about 0.03 dL/g.

10. The process of claim 4 wherein the intrinsic viscosity of the poly(trimethylene terephthalate) in one of the remelt systems is lowered by at least about 0.03 to about 0.5 dL/g.

11. The process of claim 10, wherein the intrinsic viscosities of the poly(trimethylene terephthalate) melts differ by at least about 0.03 to about 0.3 dL/g.

12. The process of claim 1, wherein the fibers are side-by-side or eccentric sheath-core fibers.

13. The process of claim 1, wherein the fibers are sheath-core fibers.

14. The fibers as claimed in claim 1, wherein the fibers are island-in-the-sea or pie-shaped.

15. The process of claim 2, wherein the fibers are side-by-side or eccentric sheath-core fibers.

16. The process of claim 2, wherein the fibers are sheath-core fibers.

17. The fibers as claimed in claim 2, when the fibers are island-in-the-sea or pie-shaped.

18. The process of claim 12, wherein the side-by-side or eccentric sheath-core bicomponent fibers are in the form of a partially oriented multifilament yarn.

19. The process of claim 1, wherein the two polymer melts in (a) are the same.

20. The process of claim 1, wherein the two polymer melts in (a) are different.

21. The process of claim 1, wherein the poly(trimethylene terephthalate) bicomponent fiber comprises a copolymer with up to 30 mole % comonomer.

22. The process of claim 21, wherein the poly(trimethylene terephthalate) bicomponent fiber comprises a copolymer with about 0.5 to about 15 mole % comonomer.

23. The process of claim 22, wherein the copolymer comprises copolyester made using 3 or more reactants, each having two ester forming groups.

24. The process of claim 1, wherein the poly(trimethylene terephthalate) is blended with up to 30 mole % of other polymers.

25. The process of claim 1, wherein the poly(trimethylene terephthalate) comprises an acid-dyeable polyester composition.

26. The process of claim 21, wherein the poly(trimethylene terephthalate) comprises a secondary amine, secondary amine salt, or tertiary amine in an amount effective to promote acid dyeability of the bicomponent fiber.

27. The process of claim 1, wherein each component comprises at least about 95 % of poly(trimethylene terephthalate), by weight, of the polymer in the component.

28. The process of claim 1, wherein each of the poly(trimethylene terephthalate)s contains at least 95 mole % trimethylene terephthalate repeat units.

29. A process for preparing poly(trimethylene terephthalate) bicomponent self-crimping yarn comprising poly(trimethylene terephthalate) bicomponent filaments, comprising

(a) preparing partially oriented poly(trimethylene terephthalate) multifilament yarn by the process of claim 18,

(b) winding the partially oriented yarn on a package,

(c) unwinding the yarn from the package,

(d) drawing the bicomponent filament yarn to form a drawn yarn,

(e) annealing the drawn yarn, and

(f) winding the yarn onto a package.

30. The process of claim 29, wherein the process further comprises drawing, annealing and cutting the fibers into staple fibers.

31. A process for preparing fully drawn yarn comprising crimped poly(trimethylene terephthalate) bicomponent fibers, comprising the steps of:

(a) providing two poly(trimethylene terephthalate)s;

(b) altering the intrinsic viscosity of at least one of said polymers such that after alteration, said polymers have intrinsic viscosities that differ by at least about 0.03 dL/g;

(c) melt-spinning the poly(trimethylene terephthalate)s from a spinneret to form at least one bicomponent fiber having either a side-by-side or eccentric sheath-core cross-section;

(d) passing the fiber through a quench zone below the spinneret;

(e) drawing the fiber at temperature of about 50 °C to about 170°C at a draw ratio of about 1.4 to about 4.5;

(f) heat-treating the drawn fiber at about 110 °C to about 170°C;

(g) optionally interlacing the filaments; and

(h) winding-up the filaments.

32. The process of claim 31, wherein the two poly(trimethylene terephthalate)s are prepared by

(a) providing two different remelt systems; and

(b) remelting a poly(trimethylene terephthalate) in each of the remelt systems, wherein at least one of the remelt systems is

operated so as to provide the poly(trimethylene terephthalate) melts having intrinsic viscosities that differ by at least about 0.03 dL/g.

33. A process for preparing poly(trimethylene terephthalate) self-crimped bicomponent staple fiber comprising:

(a). providing two poly(trimethylene terephthalate)s;

(b). altering the intrinsic viscosity of at least one of said polymers such that after alteration, said polymers have intrinsic viscosities that differ by at least about 0.03 dL/g;

(c). melt-spinning the compositions through a spinneret to form at least one bicomponent fiber having either a side-by-side or eccentric sheath-core cross-section;

(d). passing the fiber through a quench zone below the spinneret;

(e). optionally winding the fibers or placing them in a can;

(f). drawing the fiber;

(g). heat-treating the drawn fiber; and

(h). cutting the fibers into about 0.5 to about 6 inches staple fiber.

34. The process of claim 33 wherein the two poly(trimethylene terephthalate)s are prepared by

(a) providing two different remelt systems; and

(b) remelting a poly(trimethylene terephthalate) in each of the remelt systems, wherein at least one of the remelt systems is operated so as to provide the poly(trimethylene terephthalate) melts having intrinsic viscosities that differ by at least about 0.03 dL/g.

35. The process of claim 4 wherein the remelt temperature is in the range of from about 235°C to about 295°C.

36. The process of claim 35, wherein the remelt temperature is in the range of from about 235°C to about 270°C.

37. A process for preparing poly(trimethylene terephthalate) self-crimped bicomponent staple fiber comprising:

(a). providing two different poly(trimethylene terephthalate)s differing in intrinsic viscosity by about 0.03 to about 0.5 dl/g,

(b). melt-spinning the compositions through a spinneret to form at least one bicomponent fiber having either a side-by-side or eccentric sheath-core cross-section;

(c). passing the fiber through a quench zone below the spinneret;

(d). optionally winding the fibers or placing them in a can;

(e). drawing the fiber;

(f). heat-treating the drawn fiber; and

(g). cutting the fibers into about 0.5 to about 6 inches staple fiber, wherein the two different poly(trimethylene terephthalate)s are prepared by

(i) providing two different remelt systems; and

(ii) remelting a poly(trimethylene terephthalate) in each of the remelt systems, wherein at least one of the remelt systems is operated so as to provide the poly(trimethylene terephthalate) melts having intrinsic viscosities that differ by at least about 0.03 dL/g.